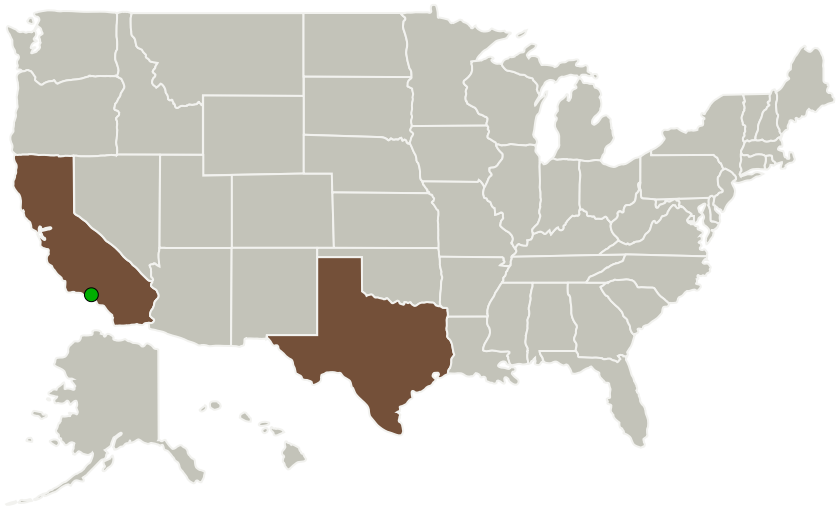
Type II SLS Materials Development for Space-based FPA Applications, Phase II

Completed Technology Project (2016 - 2019)

Project Introduction

This Phase II SBIR proposes to further develop high performance (low dark current, high quantum efficiency, and low NEdT) infrared epitaxy materials based on Type II Strained Layer Superlattice (SLS) for large format space-based sensor applications. The epi materials will be grown with Sb-capable multi-wafer production Molecular Beam Epitaxy (MBE) reactor at IntelliEPI IR. The initial goal includes achieving QE of at least 40% with LWIR spectral wavelength band near 12 um. The SLS detector design will be developed in consultation with the infrared detector group at JPL to ensure that this effort addresses NASA needs. In the superlattice engineered structure, many detector properties are determined once epitaxial growth is completed. The technical approach will be to develop improved epitaxial stack design with a goal to dramatically improve detector properties. This is based on existing high performance GaSb-based type-II SLS detector growth technology, with novel design, development of MBE growth to implement the design, and fabrication and characterization of devices from the epi grown material. The objective is to dramatically improve quantum efficiency in the detector structure. The Phaqse II effort will focus on FPA demonstration.

Primary U.S. Work Locations and Key Partners



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Organizations Performing Work	Role	Type	Location
IntelliEPI IR, Inc.	Lead Organization	Industry	Richardson, Texas
Jet Propulsion Laboratory(JPL)	Supporting Organization	NASA Center	Pasadena, California

Primary U.S. Work Locations	
California	Texas

Images

Briefing Chart Image
Type II SLS Materials Development for Space-based FPA Applications, Phase II
(https://techport.nasa.gov/image/128487)

Organizational Responsibility

Responsible Mission Directorate:
Space Technology Mission Directorate (STMD)

Lead Organization:
IntelliEPI IR, Inc.

Responsible Program:
Small Business Innovation Research/Small Business Tech Transfer

Project Management

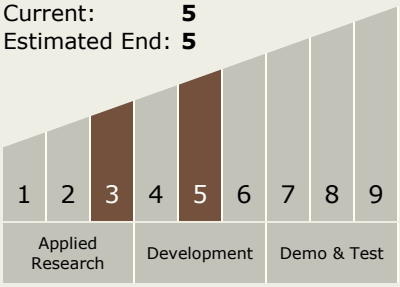
Program Director:
Jason L Kessler

Program Manager:
Carlos Torrez

Principal Investigator:
Paul R Pinsukanjana

Technology Maturity (TRL)

Start: **3**
Current: **5**
Estimated End: **5**



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Technology Areas

Primary:

- TX08 Sensors and Instruments
  - TX08.1 Remote Sensing Instruments/Sensors
    - TX08.1.1 Detectors and Focal Planes

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System